SEQUENCE LISTING

(1) GENERAL INFORMATION:

    (i) APPLICANT: Murphy, Brian R.
                Collins, Peter L.
                Whitehead, Stephen S.
                Bukreyev, Alexander A.
                Juhasz, Katalin

    (ii) TITLE OF INVENTION: PRODUCTION OF ATTENUATED RESPIRATORY
          SYNCYTIAL VIRUS VACCINES FROM CLONED NUCLEOTIDE SEQUENCES

    (iii) NUMBER OF SEQUENCES: 14

    (iv) CORRESPONDENCE ADDRESS:
        (A) ADDRESSEE: Townsend and Townsend and Crew LLP
        (B) STREET: Two Embarcadero Center, 8th Floor
        (C) CITY: San Francisco
        (D) STATE: CA
        (E) COUNTRY: USA
        (F) ZIP: 94111-3834

    (v) COMPUTER READABLE FORM:
        (A) MEDIUM TYPE: Floppy disk
        (B) COMPUTER: IBM PC compatible
        (C) OPERATING SYSTEM: PC-DOS/MS-DOS
        (D) SOFTWARE: PatentIn Release #1.0, Version #1.25

    (vi) CURRENT APPLICATION DATA:
        (A) APPLICATION NUMBER: US
        (B) FILING DATE: 15-JUL-1997
        (C) CLASSIFICATION:

    (vii) PRIOR APPLICATION DATA:
        (A) APPLICATION NUMBER: US 60/047,634
        (B) FILING DATE: 23-MAY-1997

    (vii) PRIOR APPLICATION DATA:
        (A) APPLICATION NUMBER: US 60/046,141
        (B) FILING DATE: 09-MAY-1997

    (vii) PRIOR APPLICATION DATA:
        (A) APPLICATION NUMBER: US 60/021,773
        (B) FILING DATE: 15-JUL-1996

    (viii) ATTORNEY/AGENT INFORMATION:
        (A) NAME: Parmelee, Steven W.
        (B) REGISTRATION NUMBER: 31,990
        (C) REFERENCE/DOCKET NUMBER: 17634-000510

    (ix) TELECOMMUNICATION INFORMATION:
        (A) TELEPHONE: 206-467-9600
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(2) INFORMATION FOR SEQ ID NO:1:

    (i) SEQUENCE CHARACTERISTICS:
        (A) LENGTH: 15223 base pairs
        (B) TYPE: nucleic acid
        (C) STRANDEDNESS: single
        (D) TOPOLOGY: linear

    (ii) MOLECULE TYPE: cDNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:1:

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CACTGAATGA CTATTGTATA GGTAAAAATG TTGACTCAAT AATGTTACCA TTGTTATCTA   13740

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TGATACTATC AAGAACCAAA AATTTCATCA TGCCTAAGAA AGCTGATAAA GAGTCTATTG   14640
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AACTAAATTA CGAGATATTA GTTTTTGACA CTTTTTTTCT CGT                      15223
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(2) INFORMATION FOR SEQ ID NO:2:

    (i) SEQUENCE CHARACTERISTICS:
        (A) LENGTH: 15225 base pairs
        (B) TYPE: nucleic acid
        (C) STRANDEDNESS: single
        (D) TOPOLOGY: linear

    (ii) MOLECULE TYPE: cDNA

    (xi) SEQUENCE DESCRIPTION: SEQ ID NO:2:

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TGATAAAGGT TAGATTACAA AATTTATTTG ACAATGACGA AGTAGCATTG TTAAAAATAA     180

CATGTTATAC TGACAAATTA ATTCTTCTGA CCAATGCATT AGCCAAAGCA GCAATACATA     240

CAATTAAATT AAACGGTATA GTTTTTATAC ATGTTATAAC AAGCAGTGAA GTGTGCCCTG     300

ATAACAACAT TGTAGTAAAA TCTAACTTTA CAACAATGCC AATATTACAA AACGGAGGAT     360

ACATATGGGA ATTGATTGAG TTGACACACT GCTCTCAATT AAACGGTCTA ATGGATGATA     420

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CCCAACCAAA CCAAGCTATT CCTCAAACAA CAATGCTCAA TAGTTAAGAA GGAGCTAATC    1080
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AACTTCCAAA AAATTGAGTG ACTTGTTGGA AGACAACGAT AGTGACAATG ATCTGTCACT    3060

TGATGATTTT TGATCAGTGA TCAACTCACT CAGCAATCAA CAACATCAAT AAAACAGACA    3120

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ATTGATCTAA ATGACATTAT GCAAAATATA GAACCAACTT ACCCTCATGG ATTAAGAGTT    11880

GTTTATGAAA GTCTACCTTT TTATAAAGCA GAAAAAATAG TTAATCTTAT ATCAGGAACA    11940

AAATCCATAA CTAATATACT TGAAAAAACA TCAGCAATAG ATACAACTGA TATTAATAGG    12000

GCTACTGATA TGATGAGGAA AAATATAACT TTACTTATAA GGATACTTCC ACTAGATTGT    12060

AACAAAGACA AAAGAGAGTT ATTAAGTTTA GAAAATCTTA GTATAACTGA ATTAAGCAAG    12120

TATGTAAGAG AAAGATCTTG GTCATTATCC AATATAGTAG GAGTAACATC GCCAAGTATT    12180

ATGTTCACAA TGGACATTAA ATATACAACT AGCACTATAG CCAGTGGTAT AATTATAGAA    12240

AAATATAATG TTAATAGTTT AACTCGTGGT GAAAGAGGAC CTACTAAGCC ATGGGTAGGT    12300

TCATCTACGC AGGAGAAAAA AACAATGCCA GTGTACAATA GACAAGTTTT AACCAAAAAG    12360

CAAAGAGACC AAATAGATTT ATTAGCAAAA TTAGACTGGG TATATGCATC CATAGACAAC    12420

AAAGATGAAT TCATGGAAGA ACTGAGTACT GGAACACTTG GACTGTCATA TGAAAAAGCC    12480

AAAAAGTTGT TTCCACAATA TCTAAGTGTC AATTATTTAC ACCGTTTAAC AGTCAGTAGT    12540

AGACCATGTG AATTCCCTGC ATCAATACCA GCTTATAGAA CAACAAATTA TCATTTCGAT    12600

ACTAGTCCTA TCAATCATGT ATTAACAGAA AAGTATGGAG ATGAAGATAT CGACATTGTG    12660

TTTCAAAATT GCATAAGTTT TGGTCTTAGC CTGATGTCGG TTGTGGAACA ATTCACAAAC    12720

ATATGTCCTA ATAGAATTAT TCTCATACCG AAGCTGAATG AGATACATTT GATGAAACCT    12780

CCTATATTTA CAGGAGATGT TGATATCATC AAGTTGAAGC AAGTGATACA AAAACAGCAT    12840

ATGTTCCTAC CAGATAAAAT AAGTTTAACC CAATATGTAG AATTATTCCT AAGTAACAAA    12900

GCACTTAAAT CTGGATCTAA CATCAATTCT AATTTAATAT TAGTACATAA AATGTCTGAT    12960

TATTTTCATA ATGCTTATAT TTTAAGTACT AATTTAGCTG ACATTGGAT  TCTAATTATT    13020

CAACTTATGA AAGATTCAAA AGGTATTTTT GAAAAAGATT GGGGAGAGGG GTACATAACT    13080

GATCATATGT TCATTAATTT GAATGTTTTC TTTAATGCTT ATAAGACTTA TTTGCTATGT    13140

TTTCATAAAG GTTATGGTAA AGCAAAATTA GAATGTGATA TGAACACTTC AGATCTTCTT    13200

TGTGTTTTGG AGTTAATAGA CAGTAGCTAC TGGAAATCTA TGTCTAAAGT TTTCCTAGAA    13260

CAAAAAGTCA TAAAATACAT AGTCAATCAA GACACAAGTT TGCATAGAAT AAAAGGCTGT    13320

CACAGTTTTA AGTTGTGGTT TTTAAAACGC CTTAATAATG CTAAATTTAC CGTATGCCCT    13380

TGGGTTGTTA ACATAGATTA TCACCCAACA CATATGAAAG CTATATTATC TTACATAGAT    13440

TTAGTTAGAA TGGGGTTAAT AAATGTAGAT AAATTAACCA TTAAAAATAA AAACAAATTC    13500

AATGATGAAT TTTACACATC AAATCTCTTT TACATTAGTT ATAACTTTTC AGACAACACT    13560

CATTTGCTAA CAAAACAAAT AAGAATTGCT AATTCAGAAT TAGAAGATAA TTATAACAAA    13620

CTATATCACC CAACCCCAGA AACTTTAGAA AATATATCAT TAATTCCTGT TAAAAGTAAT    13680
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AATAGTAACA AACCTAAATT TTGTATAAGT GGAAATACCG AATCTATAAT GATGTCAACA   13740

TTCTCTAATA AAATGCATAT TAAATCTTCC ACTGTTACCA CAAGATTCAA TTATAGCAAA   13800

CAAGACTTGT ACAATTTATT TCCAAATGTT GTGATAGACA GGATTATAGA TCATTCAGGT   13860

AATACAGCAA AATCTAACCA ACTTTACATC ACCACTTCAC ATCAGACATC TTTAGTAAGG   13920

AATAGTGCAT CACTTTATTG CATGCTTCCT TGGCATCATG TCAATAGATT TAACTTTGTA   13980

TTTAGTTCCA CAGGATGCAA GATCAGTATA GAGTATATTT TAAAAGATCT TAAGATTAAG   14040

GACCCCAGTT GTATAGCATT CATAGGTGAA GGAGCTGGTA ACTTATTATT ACGTACGGTA   14100

GTAGAACTTC ATCCAGACAT AAGATACATT TACAGAAGTT TAAAAGATTG CAATGATCAT   14160

AGTTTACCTA TTGAATTTCT AAGATTATAC AACGGGCATA TAAACATAGA TTATGGTGAG   14220

AATTTAACCA TTCCTGCTAC AGATGCAACT AATAACATTC ATTGGTCTTA TTTACATATA   14280

AAATTTGCAG AACCTATTAG CATCTTTGTC TGCGATGCTG AATTACCTGT TACAGCCAAT   14340

TGGAGTAAAA TTATAATTGA ATGGAGTAAG CATGTAAGAA AGTGCAAGTA CTGTTCTTCT   14400

GTAAATAGAT GCATTTTAAT CGCAAAATAT CATGCTCAAG ATGATATTGA TTTCAAATTA   14460

GATAACATTA CTATATTAAA AACTTACGTG TGCCTAGGTA GCAAGTTAAA AGGATCTGAA   14520

GTTTACTTAG TCCTTACAAT AGGCCCTGCA AATATACTTC CTGTTTTTGA TGTTGTGCAA   14580

AATGCTAAAT TGATTTTTTC AAGAACTAAA AATTTCATTA TGCCTAAAAA AACTGACAAG   14640

GAATCTATCG ATGCAAATAT TAAAAGCTTA ATACCTTTCC TTTGTTACCC TATAACAAAA   14700

AAAGGAATTA AGACTTCATT GTCAAAATTG AAGAGTGTAG TTAATGGGA TATATTATCA    14760

TATTCTATAG CTGGACGTAA TGAAGTATTC AGCAACAAGC TTATAAACCA CAAGCATATG   14820

AATATCCTAA AATGGCTAGA TCATGTTTTA AATTTTAGAT CAGCTGAACT TAATTACAAT   14880

CATTTATACA TGATAGAGTC CACATATCCT TACTTAAGTG AATTGTTAAA TAGTTTAACA   14940

ACCAATGAGC TCAAGAAACT GATTAAAATA ACAGGTAGTG TACTATACAA CCTTCCCAAC   15000

GAACAGTAAC TTAAAATATC ATTAACAAGT TTGGTCAAAT TTAGATGCTA ACACATCATT   15060

ATATTATAGT TATTAAAAAA TATGCAAACT TTTCAATAAT TTAGCTTACT GATTCCAAAA   15120

TTATCATTTT ATTTTTAAGG GGTTGAATAA AAGTCTAAAA CTAACAATGA TACATGTGCA   15180

TTTACAACAC AACGAGACAT TAGTTTTTGA CACTTTTTTT CTCGT                   15225
```

(2) INFORMATION FOR SEQ ID NO:3:

    (i) SEQUENCE CHARACTERISTICS:
        (A) LENGTH: 33 base pairs
        (B) TYPE: nucleic acid
        (C) STRANDEDNESS: single
        (D) TOPOLOGY: linear

   (ii) MOLECULE TYPE: cDNA

   (xi) SEQUENCE DESCRIPTION: SEQ ID NO:3:

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ACTCAAATAA GTTAATAAAA AATATCCCGG GAT                                 33
```

(2) INFORMATION FOR SEQ ID NO:4:

    (i) SEQUENCE CHARACTERISTICS:
        (A) LENGTH: 31 base pairs
        (B) TYPE: nucleic acid
        (C) STRANDEDNESS: single
        (D) TOPOLOGY: linear

    (ii) MOLECULE TYPE: cDNA

    (xi) SEQUENCE DESCRIPTION: SEQ ID NO:4:

CCCGGGATAT TTTTTATTAA CTTATTTGAG T   31

(2) INFORMATION FOR SEQ ID NO:5:

    (i) SEQUENCE CHARACTERISTICS:
        (A) LENGTH: 18 base pairs
        (B) TYPE: nucleic acid
        (C) STRANDEDNESS: single
        (D) TOPOLOGY: linear

    (ii) MOLECULE TYPE: cDNA

    (xi) SEQUENCE DESCRIPTION: SEQ ID NO:5:

GAAAGTATAT ATTATGTT   18

(2) INFORMATION FOR SEQ ID NO:6:

    (i) SEQUENCE CHARACTERISTICS:
        (A) LENGTH: 20 base pairs
        (B) TYPE: nucleic acid
        (C) STRANDEDNESS: single
        (D) TOPOLOGY: linear

    (ii) MOLECULE TYPE: cDNA

    (xi) SEQUENCE DESCRIPTION: SEQ ID NO:6:

TATATAAGCA CGATGATATG   20

(2) INFORMATION FOR SEQ ID NO:7:

    (i) SEQUENCE CHARACTERISTICS:
        (A) LENGTH: 16 base pairs
        (B) TYPE: nucleic acid
        (C) STRANDEDNESS: single
        (D) TOPOLOGY: linear

    (ii) MOLECULE TYPE: cDNA

    (xi) SEQUENCE DESCRIPTION: SEQ ID NO:7:

ACTCAAATAA GTTAAT   16

(2) INFORMATION FOR SEQ ID NO:8:

  (i) SEQUENCE CHARACTERISTICS:
   (A) LENGTH: 14 base pairs
   (B) TYPE: nucleic acid
   (C) STRANDEDNESS: single
   (D) TOPOLOGY: linear

  (ii) MOLECULE TYPE: cDNA

  (xi) SEQUENCE DESCRIPTION: SEQ ID NO:8:

TAACTTATTT GAGT   14

(2) INFORMATION FOR SEQ ID NO:9:

  (i) SEQUENCE CHARACTERISTICS:
   (A) LENGTH: 28 base pairs
   (B) TYPE: nucleic acid
   (C) STRANDEDNESS: single
   (D) TOPOLOGY: linear

  (ii) MOLECULE TYPE: cDNA

  (xi) SEQUENCE DESCRIPTION: SEQ ID NO:9:

GACACAACCC ACAATGATAA TACACCAC   28

(2) INFORMATION FOR SEQ ID NO:10:

  (i) SEQUENCE CHARACTERISTICS:
   (A) LENGTH: 32 base pairs
   (B) TYPE: nucleic acid
   (C) STRANDEDNESS: single
   (D) TOPOLOGY: linear

  (ii) MOLECULE TYPE: cDNA

  (xi) SEQUENCE DESCRIPTION: SEQ ID NO:10:

CATCTCTAAC CAAGGGAGTT AAATTTAAGT GG   32

(2) INFORMATION FOR SEQ ID NO:11:

  (i) SEQUENCE CHARACTERISTICS:
   (A) LENGTH: 27 base pairs
   (B) TYPE: nucleic acid
   (C) STRANDEDNESS: single
   (D) TOPOLOGY: linear

  (ii) MOLECULE TYPE: cDNA

  (xi) SEQUENCE DESCRIPTION: SEQ ID NO:11:

TTAAGGAGAG ATATAAGATA GAAGATG   27

(2) INFORMATION FOR SEQ ID NO:12:

    (i) SEQUENCE CHARACTERISTICS:
        (A) LENGTH: 27 base pairs
        (B) TYPE: nucleic acid
        (C) STRANDEDNESS: single
        (D) TOPOLOGY: linear

    (ii) MOLECULE TYPE: cDNA

    (xi) SEQUENCE DESCRIPTION: SEQ ID NO:12:

GTTTTATATT AACTAATGGT GTTAGTG   27

(2) INFORMATION FOR SEQ ID NO:13:

    (i) SEQUENCE CHARACTERISTICS:
        (A) LENGTH: 33 base pairs
        (B) TYPE: nucleic acid
        (C) STRANDEDNESS: single
        (D) TOPOLOGY: linear

    (ii) MOLECULE TYPE: cDNA

    (xi) SEQUENCE DESCRIPTION: SEQ ID NO:13:

TTATAATTGC AGCCATCATA TTCATAGCCT CGG   33

(2) INFORMATION FOR SEQ ID NO:14:

    (i) SEQUENCE CHARACTERISTICS:
        (A) LENGTH: 30 base pairs
        (B) TYPE: nucleic acid
        (C) STRANDEDNESS: single
        (D) TOPOLOGY: linear

    (ii) MOLECULE TYPE: cDNA

    (xi) SEQUENCE DESCRIPTION: SEQ ID NO:14:

GTGAAGTTGA GATTACAATT GCCAGAATGG   30